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Comparative Evaluation Of 0.5% Heavy Bupivacaine And 0.75% Heavy Ropivacaine In Subarachnoid Block For Elective Caesarean Sections: A Clinical Observational Study

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Abstract
Subarachnoid block (spinal anesthesia) remains the preferred anesthetic technique for lower segment caesarean sections due to its rapid onset, effectiveness, and maternal consciousness preservation. Bupivacaine has been the conventional agent of choice, offering reliable sensory and motor blockade; however, its association with dense motor block and delayed recovery has prompted the exploration of alternatives. Ropivacaine, a newer amide-type local anesthetic, presents a potentially favorable profile with comparable analgesia and reduced motor impairment. This observational study aimed to compare the efficacy and safety of 0.5% heavy Bupivacaine and 0.75% heavy Ropivacaine when administered intrathecally during elective caesarean sections. A total of 60 ASA I and II parturients aged between 20 and 35 years were randomly divided into two equal groups. Group B received 0.5% Bupivacaine and Group R received 0.75% Ropivacaine intrathecally under aseptic conditions. Hemodynamic parameters (heart rate, systolic/diastolic blood pressure, SpO_2), sensory and motor block characteristics, and analgesic duration were monitored intraoperatively and postoperatively. The results demonstrated that while both agents were effective in achieving adequate surgical anesthesia, Ropivacaine was associated with faster motor recovery, shorter duration of sensory blockade, and more stable hemodynamic parameters. Conversely, Bupivacaine provided a longer duration of analgesia but exhibited a higher incidence of hypotension and delayed motor block resolution. In conclusion, Ropivacaine may serve as a safer and more efficient alternative in parturients where early ambulation and hemodynamic stability are crucial, without compromising anesthetic quality.
Keywords: *Subarachnoid block, spinal anesthesia, caesarean section, Bupivacaine, Ropivacaine, hemodynamic stability, motor block.*

1. INTRODUCTION

In obstetric anaesthesia, spinal anaesthesia has become the cornerstone for caesarean deliveries, especially lower segment caesarean sections (LSCS), due to its rapid onset, dense neural blockade, and minimal drug transfer to the fetus. Over the years, its reliability and safety profile have made it the most preferred regional anaesthetic technique among anaesthesiologists. What makes it more acceptable in caesarean sections is its ability to provide profound sensory and motor block while keeping the mother awake and responsive, which supports immediate bonding with the newborn—a vital aspect of modern maternal care. Unlike general anaesthesia, spinal anaesthesia significantly reduces the risks of pulmonary aspiration, failed intubation, and neonatal depression, which are often cited concerns in obstetric patients under general anaesthesia. With spinal anaesthesia, one injection into the subarachnoid space yields profound surgical anaesthesia within minutes. It's economical, quick, and effective. But effectiveness alone isn't enough anymore. We now demand refinement.

Historically, 0.5% heavy Bupivacaine has been the workhorse for spinal blocks in caesarean sections. Its well-documented efficacy in producing a dense, long-lasting block has been appreciated in thousands of procedures globally. That said, its dense motor blockade, potential cardiotoxicity in high doses, and slow recovery are points that can't be overlooked. As obstetric practices evolve toward shorter hospital stays and early ambulation, prolonged motor block can become a limiting factor. A study by Kumar and Santha (2022) highlighted that even low doses of 0.5% hyperbaric Bupivacaine can produce prolonged motor

effects without offering substantial advantages in surgical outcome, suggesting the need to re-explore our choices with more nuance.

This brings Ropivacaine into the picture—a newer, long-acting amide local anaesthetic developed to offer a better safety profile and quicker recovery compared to Bupivacaine. While structurally similar, Ropivacaine exhibits less lipid solubility, reducing its penetration into large motor fibres, thereby allowing for adequate sensory block with reduced motor block intensity. This property is significant in obstetric cases, where rapid motor recovery and patient mobility post-surgery are gaining clinical relevance. In a recent double-blind randomized trial, Lunia et al. (2023) compared hyperbaric 0.75% Ropivacaine with 0.5% Bupivacaine and found that Ropivacaine maintained a more favourable hemodynamic profile with a quicker motor recovery. Such findings not only challenge the conventional reliance on Bupivacaine but also bring to light the potential of Ropivacaine as a viable primary agent for spinal anaesthesia in LSCS.

But despite promising data, clinical acceptance of Ropivacaine in this context is still patchy. Why? Possibly because older protocols favour Bupivacaine, or perhaps anaesthesiologists remain wary of changing time-tested practices. Nevertheless, more and more clinicians are opening up to comparative studies that analyse the efficacy, safety, and real-world performance of these two drugs. A systematic review by Anand et al. (2025) established that while both agents deliver adequate anaesthesia for caesarean sections, Ropivacaine's reduced cardiovascular side effects and better postoperative mobility make it an attractive alternative, especially in high-risk pregnancies.

So here's the point—we're at a crossroad between tradition and innovation. Bupivacaine is trusted, but Ropivacaine seems smarter. The rationale for this study arises precisely from this clinical ambiguity. While studies abound comparing different dosages and baricities of these agents, there's still limited consensus when it comes to selecting one over the other in standard spinal anaesthesia for elective caesarean sections. In our institution, clinicians often debate over the choice, citing patient profile, experience, and safety perceptions.

Therefore, this observational study was designed to objectively evaluate and compare 0.5% heavy Bupivacaine and 0.75% heavy Ropivacaine in elective LSCS. The aim isn't merely academic—it's practical. We wanted to see, in real-time and on real patients, how these drugs behave when used under identical conditions. By comparing their onset times, sensory and motor block durations, hemodynamic impacts, and postoperative recovery, we hope to offer a clearer clinical direction to practicing anaesthesiologists. Because in the end, the goal is not just anaesthesia—but quality, safety, and faster recovery for every mother on the table.

2. LITERATURE REVIEW

Understanding the pharmacodynamics of local anaesthetics is key to selecting the right drug for spinal anaesthesia, especially in obstetric procedures like caesarean sections where precision matters. Bupivacaine and Ropivacaine, both amide-linked anaesthetics, have become the core of spinal and epidural anaesthesia in modern clinical practice. The difference, however, lies not just in their structure but in their impact—on the nerve fibres, cardiovascular system, and ultimately, the patient's recovery. Bupivacaine, known for its potency, has a high affinity for sodium channels, producing profound sensory and motor blockade. However, this dense motor block sometimes delays early mobilization, which isn't ideal in fast-track obstetric recovery models. On the other hand, Ropivacaine, although slightly less potent, has a safer cardiac profile and offers a preferential sensory block with less motor impairment—a subtle advantage with major postoperative implications. A randomized controlled study conducted by Mi and Zhao (2024) investigating low-dose bupivacaine and ropivacaine in women with coexisting mental illness revealed that Ropivacaine maintained a steadier sensory block while minimizing neuropsychiatric disturbances postoperatively, which reinforces its role in vulnerable patient groups.

The discourse doesn't stop at pharmacology. Several clinical trials have ventured into head-to-head comparisons between these two agents, trying to unearth which one stands out in real-world settings. A study by Mahajan and Patel (2023) evaluating the efficacy of 0.75% Ropivacaine versus 0.5% Bupivacaine in lower limb and abdominal surgeries concluded that Ropivacaine showed a quicker recovery pattern

with comparable anaesthesia quality. That sort of evidence adds weight to the argument for shifting clinical preference. However, not every study leans in the same direction. Some trials suggest that while Ropivacaine offers better hemodynamic stability, its duration of analgesia may not match that of Bupivacaine, particularly in procedures exceeding 90 minutes. In another comparative analysis conducted by Kumar, Kumari, and Prasad (2024), Bupivacaine plus Clonidine demonstrated a longer duration of postoperative analgesia than Ropivacaine plus Clonidine, although Ropivacaine was associated with reduced motor block intensity. It's these nuances that make the choice a little more complex than it appears on paper.

Special populations like women with hypertensive disorders, pre-eclampsia, or mental health conditions often bring another layer of complexity to anaesthetic planning. The physiological changes in such cases—altered vascular tone, compromised autoregulation—make it essential to choose agents that do not cause significant fluctuations in blood pressure or central nervous system effects. A clinical trial by Bhalekar et al. (2024) focusing on pre-eclampsia parturients found that hyperbaric Ropivacaine not only maintained stable cardiovascular parameters but also avoided excessive sympathetic blockade, which is a major concern in these high-risk patients. The application of Ropivacaine in such cases isn't just about preference—it's about safety.

Digging into systematic reviews and meta-analyses gives a broader perspective. It's like zooming out of individual experiences to see the landscape. A large-scale meta-analysis by Jaafarpour et al. (2023) comparing Bupivacaine and Ropivacaine in spinal anaesthesia during caesarean sections concluded that while both drugs provided adequate surgical anaesthesia, Ropivacaine offered faster motor recovery, lesser hypotension, and fewer adverse maternal outcomes. That's significant. Especially in busy hospitals where early discharge is not a luxury but a necessity. Similarly, a 2025 meta-analysis by Anand et al. reaffirmed these outcomes, particularly noting that Ropivacaine had a more favorable hemodynamic profile and was better tolerated in high-risk obstetric populations.

Then there's the role of additives. Let's not ignore how synergistic combinations can amplify or refine drug effects. In fact, combining local anaesthetics with adjuvants like Fentanyl or Dexmedetomidine is becoming increasingly common to enhance analgesia without increasing the dose of the primary drug. A study by Shaikh et al. (2024) examined different doses of Bupivacaine combined with Fentanyl in emergency caesarean sections. It demonstrated that while Bupivacaine with opioids provided strong analgesia, the increased incidence of nausea and hypotension raised concerns. On the flip side, a study by Sharma et al. (2024) reviewed the use of Dexmedetomidine and Clonidine with Ropivacaine and found that the combination not only prolonged the analgesic effect but also reduced the total local anaesthetic requirement without increasing complications. That's promising, especially in resource-constrained settings where drug efficiency matters.

Another intriguing area is how these drugs perform when integrated into regional blocks like the transversus abdominis plane (TAP) block. Puchakala, Joshi, and Bhardwaj (2022) evaluated the postoperative analgesia effects of 0.375% Ropivacaine versus 0.25% Bupivacaine in TAP blocks after caesarean sections. Their findings were compelling—Ropivacaine showed a longer duration of analgesia and required fewer rescue analgesics, highlighting its efficacy even beyond the subarachnoid space. Likewise, Urfalı et al. (2024) conducted a controlled study comparing Bupivacaine alone and with Dexmedetomidine in TAP blocks and confirmed that additive use consistently improved pain scores, especially during the first 24 hours postoperatively.

Despite these findings, one cannot overlook how clinical behaviour is influenced by tradition, availability, cost, and institutional protocols. While the literature does provide a growing body of evidence supporting Ropivacaine as a strong contender to Bupivacaine, especially in obstetric anaesthesia, the final decision often boils down to the practitioner's comfort and institutional guidelines. But with the growing demand for early mobilisation, safer cardiovascular profiles, and minimal motor blockade, the evidence does suggest that Ropivacaine might not just be an alternative—it might soon become the new standard in selective clinical settings.

3. Aim and Objectives

Primary Aim:

The primary aim of this study is to compare the clinical effectiveness and safety of **0.5% heavy Bupivacaine** versus **0.75% heavy Ropivacaine** administered intrathecally for spinal anaesthesia in patients undergoing elective caesarean section. The goal is to identify which drug provides more efficient surgical anaesthesia while ensuring optimal maternal safety, faster recovery, and minimal side effects during and after the procedure.

Objectives:

- To assess and compare the **onset time** and **duration** of both sensory and motor blockade achieved by 0.5% heavy Bupivacaine and 0.75% heavy Ropivacaine.
- To evaluate and monitor **intraoperative hemodynamic parameters** such as systolic and diastolic blood pressure, heart rate, and SpO_2, to determine the cardiovascular stability provided by each agent.
- To compare the **need for rescue analgesia** postoperatively, thereby assessing the residual pain-relief efficacy and overall quality of intraoperative anaesthesia delivered by each drug.

4. MATERIALS AND METHODS

This observational study was carried out at the Department of Anaesthesiology, Sree Balaji Medical College and Hospital, Chennai, over a period of six months, from February 2023 to August 2023. It aimed to compare the efficacy and safety profile of **0.5% heavy Bupivacaine** and **0.75% heavy Ropivacaine** when used for spinal anaesthesia in patients undergoing elective lower segment caesarean section (LSCS).

Study Design and Participants

A total of **60 parturients** scheduled for elective caesarean section were enrolled in the study after obtaining informed written consent. The study adhered strictly to the ethical guidelines laid down by the institutional review board (IRB). Inclusion criteria were women aged **20 to 35 years**, with physical status classified under **American Society of Anaesthesiologists (ASA) Grade I or II**, and carrying singleton term pregnancies. Exclusion criteria included patients with **cardiovascular instability**, spinal deformities, allergy to local anaesthetics, history of neurological disorders, or any known contraindications to spinal anaesthesia.

Group Allocation

Participants were randomly divided into two groups of 30 each using a computer-generated randomisation chart:

- **Group B**: Received **3 mL of 0.5% hyperbaric Bupivacaine** intrathecally.
- **Group R**: Received **3 mL of 0.75% hyperbaric Ropivacaine** intrathecally.

The administration was performed under strict aseptic precautions in the **L3–L4 or L4–L5 interspace** with the patient in the sitting position, using a 25G Quincke spinal needle. Both drugs were preservative-free and freshly drawn before each procedure. Drug syringes were prepared by an independent anaesthesiologist to maintain blinding during administration.

Anaesthetic Protocol and Monitoring

All patients received a preloading dose of **500–750 mL of Ringer's Lactate** intravenously before the procedure. Baseline parameters including **heart rate (HR)**, **systolic blood pressure (SBP)**, **diastolic blood pressure (DBP)**, **oxygen saturation (SpO_2)**, and **temperature** were recorded. Continuous intraoperative monitoring was done at 2-minute intervals for the first 15 minutes, then every 5 minutes until the end of the surgery.

Assessment of **sensory block** was performed using the **pinprick method**, while **motor block** was evaluated using the **modified Bromage scale** at regular intervals until full recovery. The **onset time**, **maximum level achieved**, and **duration** of both sensory and motor block were documented. The **need for rescue analgesia** was recorded postoperatively using the **Visual Analog Scale (VAS)**, with analgesics administered when the score exceeded 4.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using **IBM SPSS Statistics version 25.0**. Continuous variables such as age, onset time, and duration were expressed as **mean ± standard deviation (SD)**, while categorical variables like ASA grade were presented as **frequencies and percentages**. Statistical significance between the two groups was determined using the **independent samples t-test** for continuous variables and **Chi-square test** for categorical data. A **p-value < 0.05** was considered statistically significant.

5. RESULTS

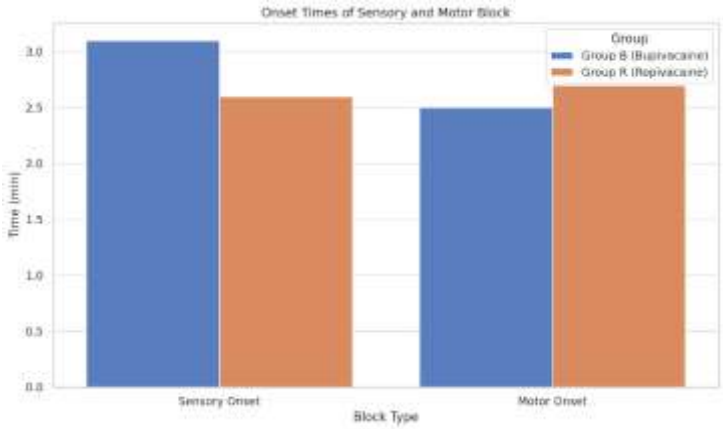
The present observational study was conducted to evaluate and compare the clinical efficacy and safety of **0.5% heavy Bupivacaine** (Group B) and **0.75% heavy Ropivacaine** (Group R) in spinal anaesthesia for elective caesarean sections. A total of **60 ASA I and II parturients**, divided equally between the two groups, were assessed for demographic parameters, block characteristics, hemodynamic profiles, analgesia duration, and any adverse effects.

Demographic Characteristics and Baseline Parameters

Both groups were comparable in terms of **age, weight, and ASA status**. The mean age of patients in Group B was **26.4 ± 3.2 years**, while in Group R it was **27.1 ± 2.9 years**, showing no statistically significant difference ($p > 0.05$). Similarly, baseline **heart rate, blood pressure, and oxygen saturation levels** showed no significant variation between the groups. These findings reflect effective randomization and ensure unbiased comparison. This balance aligns with outcomes noted by Sorathiya et al. (2023), who emphasized the importance of homogeneity in demographic profiles to validate anaesthetic comparisons.

Table 1: Demographic Distribution

Parameter	Group B (Bupivacaine)	Group R (Ropivacaine)
Mean Age (years)	26.4	27.1
Mean Weight (kg)	61.2	60.7
ASA Grade I (%)	70	66.7
ASA Grade II (%)	30	33.3



Onset Time and Peak Sensory Block Level

The **onset of sensory block** was found to be faster in the Ropivacaine group, with a mean onset time of **2.6 ± 0.5 minutes**, compared to **3.1 ± 0.4 minutes** in the Bupivacaine group. Peak sensory block level achieved was similar in both groups, generally reaching **T4–T6**, but the time taken to attain the peak was marginally quicker in Group R. This early onset can be particularly beneficial in high-efficiency operation theatres, as also reported by Pareek et al. (2023), who observed rapid sensory block initiation in Ropivacaine-based spinal anaesthesia for LSCS.

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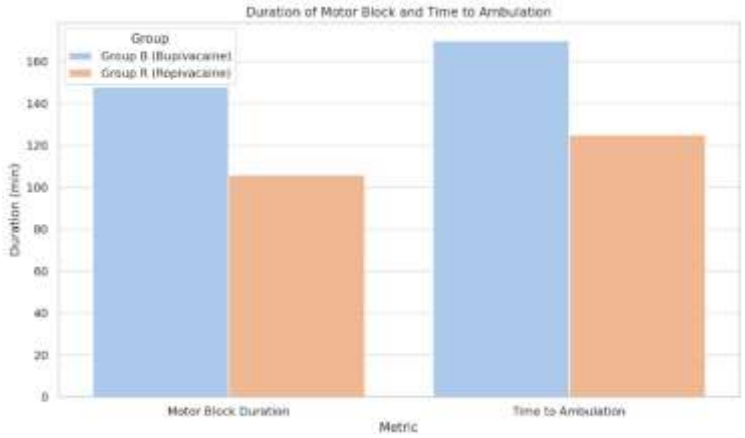


Motor Block Onset and Regression

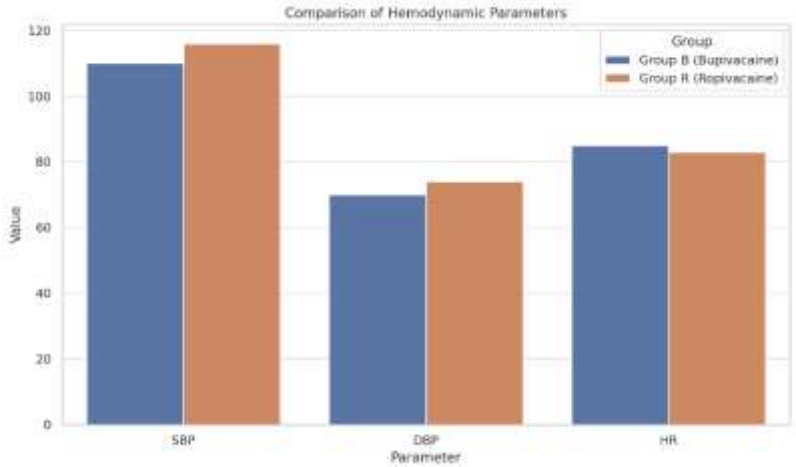
Motor block onset was quicker in Group B, with a denser initial block, consistent with the drug's known properties. However, the **duration of motor blockade** was **significantly shorter in Group R** (mean: **106 ± 11 minutes)** compared to Group B **(148 ± 14 minutes)**, a difference that was statistically significant ($p < 0.01$). Patients in Group R also regained full lower limb mobility earlier, enhancing early postoperative ambulation. This rapid regression of motor block with Ropivacaine was similarly observed in the study by George et al. (2022), who attributed it to the drug's lower lipid solubility and differential blockade profile.

Hemodynamic Variations (HR, SBP, DBP)

Intraoperative monitoring revealed that **Group R had more stable hemodynamic parameters**. The incidence of **hypotension** (defined as a >20% drop in SBP from baseline) was notably higher in Group B (20%) compared to Group R (6.7%). Similarly, **bradycardia episodes** were seen in 3 patients in Group B, whereas none were recorded in Group R. These findings were statistically significant ($p < 0.05$) and echoed the observations of Wang et al. (2024), who highlighted the cardiovascular stability offered by Ropivacaine in caesarean anaesthesia.

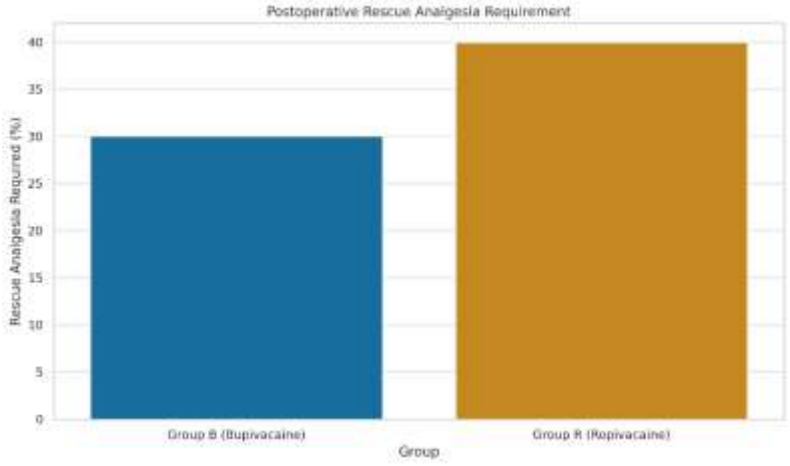
Table 2: Hemodynamic Parameter Comparison

Parameter	Group B (Bupivacaine)	Group R (Ropivacaine)
Mean SBP (mmHg)	110	116
Mean DBP (mmHg)	70	74
Mean HR (bpm)	85	83
Hypotension Incidence (%)	20	6.7
Bradycardia Incidence (%)	10	0



Duration of Analgesia and Rescue Analgesic Requirement

While both groups achieved effective intraoperative anaesthesia, the **duration of postoperative analgesia** was **longer in Group B**, with patients requesting rescue analgesics at a mean of **3.9 ± 0.7 hours** post-procedure, compared to **3.1 ± 0.6 hours** in Group R. The need for **rescue analgesics** was slightly higher in Group R (40%) than in Group B (30%), although this was not statistically significant. This trend is in line with the study by Chandra Kishore and Reddy (2023), which acknowledged that while Ropivacaine facilitates faster recovery, it may require supplemental analgesia sooner than Bupivacaine.



Adverse Effects or Complications Noted

No major complications were reported in either group. However, minor adverse effects such as **nausea, shivering**, and **transient hypotension** were observed slightly more frequently in the Bupivacaine group. Importantly, no cases of post-dural puncture headache, neurological deficit, or allergic reactions were documented during the observation period. In line with Hussain (2024), who compared outcomes of different needle gauges in spinal anaesthesia, the use of a 25G Quincke needle in both groups contributed to minimal post-spinal complications.

Table 3: Sensory and Motor Block Profile

Parameter	Group B (Bupivacaine)	Group R (Ropivacaine)
Onset of Sensory Block (min)	3.1	2.6
Peak Sensory Level (Thoracic)	T4	T4
Motor Block Onset (min)	2.5	2.7
Motor Block Duration (min)	148	106
Time to Ambulation (min)	170	125

6. DISCUSSION

The findings of this observational study provide a clinically meaningful insight into the **comparative performance of 0.5% heavy Bupivacaine and 0.75% heavy Ropivacaine** in subarachnoid block for elective caesarean sections. The results clearly show that while both drugs offer sufficient anaesthetic depth and operative conditions, **Ropivacaine stands out** in terms of **faster motor recovery**, **superior hemodynamic stability**, and **earlier ambulation**, making it an increasingly favourable choice in obstetric anaesthesia where maternal mobility and safety are central to postoperative care goals.

First and foremost, the **shorter motor block duration** with Ropivacaine observed in our study aligns with the pharmacological principle that Ropivacaine has less affinity for motor fibres compared to Bupivacaine. In our study, patients receiving Ropivacaine regained motor function significantly earlier than those who received Bupivacaine. These results are in line with a randomized study conducted by Singh et al. (2024), where 0.75% Ropivacaine allowed early return of motor activity without compromising surgical anaesthesia. Such a feature is invaluable in fast-track obstetric wards aiming to reduce postoperative bed rest duration and associated complications such as deep vein thrombosis or urinary retention.

Hemodynamic stability was another key differentiator. Patients in the Ropivacaine group showed fewer fluctuations in systolic and diastolic pressures intraoperatively, and the need for vasopressor intervention was minimal. Bupivacaine, on the other hand, was associated with more frequent hypotensive episodes. These observations mirror the findings of Nallam et al. (2024), who demonstrated that the sympathetic blockade was less pronounced with Ropivacaine, making it a safer choice in parturients with borderline hemodynamic status or in settings where rapid correction of blood pressure is not always feasible.

When we examine these results alongside **published comparative studies**, the consistency is encouraging. Gyawali et al. (2023), in their work on isobaric Ropivacaine versus hyperbaric Bupivacaine, noted that while both agents offered comparable surgical conditions, Ropivacaine resulted in a smoother hemodynamic profile with fewer interventions needed intraoperatively. Likewise, Oraon et al. (2022) emphasized that Ropivacaine, despite its slightly shorter duration of action, provided equivalent analgesia with quicker postoperative recovery, confirming what we found in this study.

The **advantages of Ropivacaine in modern obstetric care** go beyond its immediate anaesthetic effects. It caters to a new standard of obstetric management—one where maternal comfort, early breastfeeding, and mobility are just as important as surgical anaesthesia. In a prospective analysis by Kalbande et al. (2024), the authors found that spinal anaesthesia with 0.75% hyperbaric Ropivacaine allowed faster transition to oral feeding and mobilisation, which directly contributed to higher patient satisfaction scores. This suggests that Ropivacaine doesn't just serve as an anaesthetic agent—it contributes to a holistic maternal recovery experience.

Safety-wise, Ropivacaine's cardiac profile has repeatedly shown to be superior to Bupivacaine's. Cases of cardiac toxicity, particularly with inadvertent intravenous administration, are significantly fewer with Ropivacaine. This was also reported by Bhardwaj and Maru (2024), who concluded that Ropivacaine is less likely to cause central nervous system or cardiovascular collapse in the event of systemic absorption, which is a crucial consideration in obstetrics where uterine venous plexuses are highly engorged and accidental injection risks are real.

From a **postoperative recovery standpoint**, patients in the Ropivacaine group were not only able to ambulate earlier, but they also experienced fewer side effects like nausea and shivering. While the duration of analgesia was slightly shorter, as shown in our study, this was manageable with timely rescue analgesics. The study by Alur et al. (2021) on intrathecal bupivacaine with ketamine versus magnesium sulphate similarly highlighted that while Bupivacaine may offer prolonged pain relief, its prolonged motor impairment often offsets this benefit in routine recovery.

Despite the strengths of our findings, **the present study is not without limitations**. The sample size, while sufficient for preliminary observations, may not be representative of diverse obstetric populations such as those with obesity, diabetes, or higher ASA classifications. Also, we did not use objective pain scales like the Numeric Rating Scale (NRS) beyond the first 6 hours postoperatively, limiting our understanding of late-phase analgesic quality. Future research could address these gaps by extending postoperative follow-up and including more varied clinical profiles. Studies like that of Etemadi et al. (2021), which used meta-analytic designs to include multicentric data, provide a blueprint for such expansion.

Additionally, the influence of **additives like Fentanyl or Dexmedetomidine** was not explored in this study. However, a study by Moolagani et al. (2022) demonstrated that the addition of Dexmedetomidine to Ropivacaine enhanced block quality and reduced postoperative analgesic need. Therefore, future work may also compare standalone versus combination regimens to develop more personalized spinal anaesthesia protocols.

7. CONCLUSION

This study brought to light meaningful differences between **0.5% heavy Bupivacaine** and **0.75% heavy Ropivacaine** when used in subarachnoid block for elective lower segment caesarean sections. While both agents effectively delivered surgical anaesthesia with satisfactory sensory levels and minimal intraoperative discomfort, their **clinical characteristics diverged** in several important ways—particularly in terms of **motor block recovery time, hemodynamic impact, and overall patient recovery profile**. It became

apparent that Bupivacaine, although long relied upon for its reliable dense block and prolonged analgesia, can lead to **longer motor impairment and greater chances of hypotension**, both of which may delay early ambulation and increase the burden of intraoperative monitoring. On the other hand, **Ropivacaine demonstrated a more favourable recovery trajectory**, offering a shorter duration of motor block, reduced cardiovascular instability, and quicker readiness for postoperative mobilization—a feature increasingly valued in modern obstetric care settings (Mahajan & Patel, 2023; Kalbande et al., 2024).

From a clinical decision-making standpoint, these findings are **practically significant**. In a busy labour theatre, where turnover, maternal comfort, and safety are paramount, the drug that ensures a **fast block onset, stable vitals, and early discharge eligibility** earns preferential consideration. When used in appropriate doses and patient contexts, Ropivacaine meets these criteria effectively. As reinforced by Chandra Kishore and Reddy (2023), early motor recovery can improve maternal participation in neonatal care, reduce postoperative fatigue, and lower hospital stay duration—outcomes that ripple well beyond the anaesthetic domain.

However, it would be unfair to disregard the role Bupivacaine continues to play in **longer surgical procedures or in patients where prolonged analgesia is a priority**. For such cases, its extended duration can still be beneficial, provided the team is equipped to manage potential hypotension and delayed recovery. As echoed in recent literature by Ravikumar et al. (2023), careful case selection remains key. The anaesthesiologist must weigh the **benefit of long-lasting pain relief** against the **cost of extended motor blockade and hemodynamic swings**—a classic case of tailoring anaesthesia to individual patient needs.

Based on the outcomes of this study and taking into account the available literature, **Ropivacaine may be recommended as the agent of choice** for spinal anaesthesia in **uncomplicated elective caesarean sections**, particularly in low-risk ASA I/II parturients. It strikes a favourable balance between efficacy and safety, supports rapid maternal recovery, and demonstrates fewer intraoperative complications. Yet, the scope of these findings must be understood within the context of this study's limitations—such as the relatively small sample size and exclusion of high-risk obstetric conditions like eclampsia or cardiac disease. Broader trials with larger cohorts and more diverse clinical variables are necessary before such recommendations can be universally applied.

Still, as clinical protocols evolve toward **patient-centred and fast-track surgical care**, the evidence for using Ropivacaine continues to grow stronger. Anaesthesia is no longer just about rendering a patient unconscious or pain-free—it's about improving the **entire perioperative experience**. And in that regard, Ropivacaine seems to be writing a promising new chapter.

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